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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

WALKER, KEITH D

ART UNIT

PAPER NUMBER

1795

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/720,244	Applicant(s) TAKESHITA ET AL.	
	Examiner KEITH WALKER	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,7,10,12,13 and 22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,7,10,12,13 and 22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/17/09 has been entered.

Response to Amendment

Claims 1, 7, 10, 12, 13 and 22 are pending examination as discussed below.

The certified English translation of JP 2002-345955 submitted 1/13/2010 is accepted and as such the rejections regarding the prior art of Menon are withdrawn.

Claim Objections

Applicant is advised that should claim 1 be found allowable, claim 22 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Interpretation

Regarding claim 1, the limitation starting in line 5, "... a plurality of ribs that are provided in the grooves" is a broad limitation with multiple meanings. The first interpretation is multiple ribs that form multiple grooves and as such the ribs are "in the grooves". The second interpretation is what applicant appears to intend but has not actually claimed, which is represented by figure 3A & 3B of the instant specification. As such both interpretations will be addressed below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 7 & 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP Publication 63-119166 (Sakai) in view of US 4,476,197 (Herceg).

Sakai teaches a fuel cell stack with a supply port and discharge port provided at the same end of the stack (Figs. 3 & 4). The separator plates have a plurality of grooves with a plurality of ribs between (Abstract). The pressure loss of a first cell is smaller than that of a second cell and as the plates have different configurations, the water draining characteristics are different. The cell with the smaller pressure loss is disposed in a vicinity of a second end portion of the cell stack (Abstract). A plurality of

grooves is formed by the ribs and a plurality of other ribs is in the plurality of grooves formed by the ribs. Since the fuel cell is configured

Regarding claim 7, this limitation is drawn to a method of operating or intended use of the fuel cell and while intended use recitations and other types of functional language are not entirely disregarded, the intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function (MPEP § 2114). The manner of operating the device does not differentiate an apparatus claim from the prior art.

Sakai is silent to the first block with the smaller pressure loss and the larger gas passages being disposed in a vicinity of a second end portion of the fuel cell stack.

Sakai is also silent to the distribution of the oxidant gas to the fuel cell stack.

Herceg teaches a fuel cell stack that operates by supplying oxidant gas to a first end section and an oxidant gas exhaust from the same first end section. The fuel gas is supplied to the fuel cell from a second end section and exhausted from the same second end section (Fig. 1; 6:20-50). Herceg teaches supplying the fuel gas reactant in the same manner as Sakai and further teaches how to supply the oxidant reactant gas to the fuel cell system. The second end portion is supplied with the fuel gas, the same as taught by Sakai, and this second end portion has the first block configuration (smaller pressure loss and larger gas passages).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the fuel cell stack of Sakai with the oxidant supply passage of Herceg to teach how to provide oxidant to a fuel cell stack with the same configuration as Sakai. Combining prior art elements according to known methods to yield predictable results and using known techniques to improve similar devices in the same way are considered obvious to one of ordinary skill in the art (KSR, MPEP 2141 (III)).

2. Claims 1, 7 & 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP Publication 63-119166 (Sakai) in view of US 4,476,197 (Herceg) and US 4,743,518 (Romanowski).

The teachings of Sakai and Herceg as discussed above are incorporated herein.

Regarding the second interpretation of claim 1, Sakai is silent to a plurality of protrusions located within the ribs.

Romanowski teaches a fuel cell separator having a gas distribution path with small protrusions in the grooves formed between the ribs (Abstract; Fig. 2). The protrusions help distribute the reactant across the electrode surface (3:35-40). Romanowski teaches it is known in the art to use studs within the grooves of separator plates to increase the reactant distribution.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the grooves of Sakai with the studs of Romanowski to increase the reactant distribution to the surface of the electrode.

3. Claims 10, 12 & 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP Publication 63-119166 (Sakai) in view of US 4,476,197 (Herceg) and US 4,743,518 (Romanowski) as applied to claim 1 and further in view of US 2003/0113608 (Hong).

The teachings of Sakai, Herceg and Romanowski as discussed above are incorporated herein.

Sakai is silent to a solid polymer electrolyte, a waterproof cell block or a high drainage configuration.

Hong teaches a fuel cell with a solid polymer electrolyte and a separator plate made of stainless steel, which is waterproof (Abstract; [0005, 0006]). Using a metal separator plate offers a waterproof structure, higher physical strength and lower manufacturing costs. Solid polymer electrolyte based fuel cells are well known in the art and typically used for portable applications.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the fuel cell of Sakai with the waterproof metal separator plate of Hong to increase the strength of the plate and lower the production costs. Combining prior art elements according to known methods to yield predictable results and using known techniques to improve similar devices in the same way are considered obvious to one of ordinary skill in the art (KSR, MPEP 2141 (III)).

Since the same fuel cell with the same characteristics as claimed are taught by the prior art, the high drainage configuration is inherently present.

4. Claims 1, 7, 10, 12, 13 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2001-357869 (Hamada) in view of JP Publication 63-119166 (Sakai) and US 4,476,197 (Herceg).

The teachings of Sakai as discussed above are incorporated herein.

Hamada teaches a solid high polymer type fuel cell stack in which performance of unit cells at the two ends of the stack are prevented from dropping. The fuel cell stack is structured such that a plurality of unit cells are laid one over another according to one of the following: 1) the water repellency of the cathode gas diffusion layer of each unit cell located at the stack ends is made lower than that of the unit cells located elsewhere in the stack; 2) the gas permeability of the cathode gas diffusion layer of each unit cell located at the ends is made higher than that of the unit cells located elsewhere in the stack; 3) the specific surface area of the carbon material of the mixture layer in the cathode of each unit cell located at the ends is made greater than that of the unit cells located elsewhere in the stack; and, 4) the pressure loss in the cathode side gas passage of each unit cell located at the ends is made smaller than that of the unit cells located elsewhere in the stack (Abstract). The channel depth of the separator located at an end of the stack is increased by 10% compared with a gas passageway of a single cell located in other parts of the stack ([0031]). Reactant gas is supplied from the clamping plates located at both ends of the stack ([0013]). A plurality of grooves is

formed by the ribs and a plurality of other ribs is in the plurality of grooves formed by the ribs (Fig. 1).

Regarding claim 7, this limitation is drawn to a method of operating or intended use of the fuel cell and while intended use recitations and other types of functional language are not entirely disregarded, the intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function (MPEP § 2114). The manner of operating the device does not differentiate an apparatus claim from the prior art.

Hamada is silent to the discharge port being located on the same side as the supply port.

Herceg teaches a fuel cell stack that operates by supplying oxidant gas to a first end section and an oxidant gas exhaust from the same first end section. The fuel gas is supplied to the fuel cell from a second end section and exhausted from the same second end section (Fig. 1; 6:20-50). Herceg teaches how to supply the oxidant and fuel reactant gases to the fuel cell system.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the fuel cell stack of Hamada with the oxidant supply passage and fuel supply passage of Herceg to teach how supply the fuel cell stack with the reactants. Combining prior art elements according to known methods to

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yield predictable results and using known techniques to improve similar devices in the same way are considered obvious to one of ordinary skill in the art (KSR, MPEP 2141 (III)).

Hamada is silent to the cross-sectional area of a gas paths formed between the ribs being larger in the first cell block than the second cell block.

Sakai teaches a fuel cell stack with a supply port and discharge port provided at the same end of the stack (Figs. 3 & 4). The separator plates have a plurality of grooves with a plurality of ribs between (Abstract). The pressure loss of a first cell is smaller than that of a second cell and as the plates have different configurations, the water draining characteristics are different. The cell with the smaller pressure loss is disposed in a vicinity of a second end portion of the cell stack (Abstract). The plurality of ribs in the grooves forms a gas path where the pitch between the ribs is larger for a first plate than a second plate (Abstract). This configuration improves reliability and performance of the fuel cell by increasing the cross-sectional area of the fuel gas passages.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the separator path of Hamada with the different pitched paths of Sakai to improve the fuel cell operation by increasing the cross-sectional area of the fuel gas passages.

Response to Arguments

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection based on the amendment and the English translation of priority document JP 2002-345955.

As discussed above, the amendments provide alternate interpretations of the claimed invention. Both interpretations have been addressed above in the rejections.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEITH WALKER whose telephone number is (571)272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Keith Walker/
Primary Examiner, Art Unit 1795